

what is claimed is

CLAIMS

1. A method for the identification and/or the quantification of a target compound obtained from a sample, preferably a biological sample, comprising the steps of:

- 5 - putting into contact the target compound with a capture molecule in order in order to allow a specific binding between said target compound with a capture molecule, said capture molecule being fixed upon a surface of a solid support according to an array comprising a density
- 10 of at least 20 discrete regions per cm^2 , each of said discrete regions being fixed with one species of capture molecules,
- performing a reaction leading to a precipitate formed at the location of said binding,
- 15 - determining the possible presence of precipitate(s) in discrete region(s), and
- correlating the presence of the precipitate(s) at the discrete region(s) with the identification and/or a quantification of said target compound.

20 2. The method according to claim 1, characterized in that the reaction leading to the formation of a precipitate is obtained by the precipitation of a metallic compound upon the bounded target compound.

25 3. The method according to claim 2, characterized in that said metallic compound is a magnetic metallic compound.

30 4. The method according to any one of the preceding claims, characterized in that the reaction leading to the formation of the precipitate is a reduction of a metal in the presence of an enzyme.

5. The method according to claim 1 or 2, characterized in that the reaction leading to the formation of the precipitate is a chemical reduction of silver in the

presence of colloidal gold particles coupled to the bounded target compound.

6. The method according to any one of the preceding claims, characterized in that the specific binding between the target compound and its corresponding capture molecule is an hybridisation between two nucleotide sequences.

7. The method according to any one of the claims 1 to 5, characterized in that the binding between the target compound and its corresponding capture molecule is a reaction between an antigenic structure and its corresponding antibody or a hypervariable portion thereof.

8. The method according to any one of the preceding claims, characterized in that the binding between
15 the target compound and its corresponding capture molecule is a reaction between a receptor and its corresponding ligand.

9. The method according to any one of the preceding claims, characterized in that the possible
20 presence of a precipitate is obtained by reflection, absorption or diffusion of a light beam, preferably a laser beam, upon said precipitate.

10. The method according to any one of the preceding claims, characterized in that the presence of a precipitate in a discrete region is obtained by variation of an electromagnetic field or the conductance of an electric current.

11. The method according to any of the preceding claims 1 to 10, for the quantification of volume of one or more precipitate(s) upon a defined surface of the solid support, characterised in that images of said defined surface containing one or more precipitate(s) and corresponding to different views, said images containing analogue information, are taken by one or more camera(s)

upon illumination by one or more illuminant source(s), spatially arranged relatively to each other according to a predetermined pattern and characterised in that the corresponding image analogue information of said defined surface containing said precipitate(s) are transformed and converted into digital form or set of digital forms and compared to a first and to a second reference standards to determine the volume of the precipitate(s) to be quantified.

10 12. The method according to claim 11,
characterised in that the first reference standard
corresponds to a digital form or a set of digital forms
obtained from analogue information contained in images
taken on the surface of said solid support (1) without
15 precipitate.

13. The method according to the claim 12, characterised in that the second reference standard corresponds to a digital form or a set of digital forms obtained from analogue informations contained in images taken on the surface of said solid support (1) containing precipitate(s) of known volume.

14. Diagnostic and/or quantification apparatus of one or more identical or different target compound(s) obtained from a sample, characterized in that
25 it comprises:

- a detection and/or quantification device of precipitate(s) formed at the location of a binding of said target compound with a capture molecule upon a surface of a solid support according to an array comprising at least 20 discrete regions per cm^2 , each of said discrete regions being fixed with one species of capture molecule,

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15. Apparatus according to claim 14, comprising one or more sensor(s) provided with camera(s) (3, 3', 3'') and with one or more illuminant source(s) (2, 2') which are spatially arranged relatively to each other according to a predetermined pattern and which are associated with an analogue information acquisition system, said information being measured by using sensor(s) and being converted into digital form by a processing unit.

16. The apparatus according to claim 15, characterised in that the camera(s) are CCD or CMOS camera(s) (3, 3', 3'').

17. The apparatus according to claim 15 or 16, characterised in that the illuminant source (2, 2') is an infra-red light having a wavelength similar to a metal crystal contained in the precipitate(s).

18. The apparatus according to any of the preceding claims 15 to 17, characterised in that it comprises a set of illuminant sources (2, 2') regularly spaced from each other in a plane, each of said sources corresponding to a light spot being automatically switched on, simultaneously or successively.

19. The apparatus according to any of the preceding claims 15 to 18, characterised in that it comprises one camera (3) and one illuminant source (2) placed above the solid support, said camera and illuminant source being movable in three dimensions in space.

ad cont. 10 20. The apparatus according to any of the preceding claims 15 to 18, characterised in that it comprises two or more cameras (3, 3') oppositely arranged in a plane and placed above the solid support, the apparatus comprising further one or more illuminant source(s) (2, 2') placed under the solid support (1).

15 21. The apparatus according to any of the preceding claims 15 to 18, characterised in that it comprises three or more cameras (3, 3', 3'') arranged according to a triangular plane or another regular or irregular pattern and placed above the solid support (1) and further comprising one or more illuminant source(s) (2, 2') placed under the solid support (1).

20 22. The apparatus according to any of the preceding claims 15 to 18, characterised in that it comprises, placed above the solid support (1), one camera (3) and a first illuminant source (2) and, under said camera (3), a second illuminant source (2') placed under the solid support (1), the two illuminant sources (2, 2') being placed almost symmetrically according to the position of the solid support (1).

25 23. A computer program comprising program code means for performing the steps of determining the possible presence of a precipitate in discrete regions and correlating the presence of said precipitate at the discrete regions with the identification and/or the quantification of a target compound, according to the method of any of the preceding claims 1 to 13, when said program is run on a computer.

24. A computer program product comprising program code means stored on a computer readable medium for performing the steps of determining the possible presence of a precipitate in a discrete region and correlating the presence of the precipitate at the discrete region with the identification and/or the quantification of a target compound, according to the method of claims 1 to 13, when said program is run on a computer.

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